02740 – BASE COARSE AND PAVING

(Last revised 3/29/05)

SELECTED LINKS TO SECTIONS WITHIN THIS SPECIFICATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this specification.

B. Section 01000 – GENERAL REQUIREMENTS

C. Section 02200 – EARTHWORK

D. Section 02275 – TRENCHING, BACKFILLING & COMPACTION OF UTILITIES.

E. Section 02400 – CURB & GUTTER, DRIVEWAYS AND SIDEWALKS

F. Section 02920 – SEEDING, SODDING, & GROUNDCOVER

1.2 SUMMARY

This section includes all equipment, labor, material, and services required for complete installation of aggregate base coarses and bituminous concrete pavement structures and specialties for municipal street systems.

1.3 DEFINITIONS

A. General

For the purposes of this specification, the following definitions refer to roadway and street systems that come under the authority of the City of Fairfax, Virginia as specified within this section and other sections of this manual.

1) **Aggregate Subbase Coarse**: A layer of materials of a specified thickness placed between the subgrade and bituminous paving coarse.

2) **Base Coarse**: A layer of material of a specified thickness placed between the surface coarse and aggregate subbase coarse.

3) **Cold Patch**: A layer of temporary asphaltic concrete mixture used for the repair and patching of small pavement areas in asphaltic concrete and Portland cement concrete in cool to cold weather applications.

4) **Bikeway/Greenway/Trail**: A facility, and its appurtenances, used for the public conveyance of pedestrians and/or bicyclists that is maintained by the City of Fairfax, Fairfax County or the Virginia Department of Transportation.

5) **Public Road System**: Roadway, streets, and their appurtenances required for the conveyance of the motoring public that are maintained by either the City of Fairfax or the Virginia Department of Transportation.

6) **Intermediate Coarse**: A layer of bituminous material of a specified thickness that is placed between the subgrade or base coarse and the surface bituminous paving coarse.

7) **Prime Coat**: Prime coat means an application of low-viscosity liquid asphalt to an absorbent surface. It is used to prepare an untreated base for an asphalt surface. The prime penetrates the base and plugs the voids, hardens the top, and helps bind it to the overlying asphalt coarse. It also reduces the necessity of maintaining an untreated base coarse prior to placing the asphalt pavement. Prime coats do not include tack coat.

8) **Subbase Coarse**: A layer of material of a specified thickness that is placed on a subgrade to support a base coarse.

9) **Subgrade**: The top surface of a roadbed shaped to conform to the typical section on which the pavement structure and shoulders are constructed.

10) **Subgrade Stabilization**: The modification of roadbed soils by admixing with stabilizing or chemical agents that will increase the load bearing capacity, firmness, and resistance to weathering or displacement.

11) **Suitable Subgrade**: A subgrade that consists of a material type and density that is approved by the Public Works Director for placing a subsequent layer of material.

12) **Surface Coarse/Wearing Surface**: The top layer of a pavement structure, which resists skidding, traffic abrasion, and disintegrating effects of weather.

13) **Tack Coat**: Any application of asphalt applied to an existing surface to provide bond between new surfacing and existing surface and to eliminate slippage planes where the new and existing surfaces meet.

1.4 SUBMITTALS

A. Submit job-mix formula for each mixture to be supplied within 30 days after contract is awarded.

B. Sumit product data and shop drawings for manhole, lampstack, and valve box adjustment rings.

C. MSDS sheet on cold patch.

1.5 QUALITY ASSURANCE

A. Asphalt concrete pavement thickness and density shall conform to the requirements of Section 315, *Asphalt Concrete Pavement* of VDOT *Road and Bridge specifications*.

B. Bituminous pavement coring sample thickness and density test reports shall be submitted at completion of project in accordance with the requirements of Section 315, *Asphalt Concrete Pavement* of VDOT *Road and Bridge Specifications*.

C. Aggregate base coarse density shall conform to the requirements of Section 308, *Subbase Coarse* and 309, *Aggregate Base Coarse* of VDOT *Road and Bridge specifications*.

D. Materials and operations shall comply with the latest revision of all applicable codes and standards.

1.6 STANDARD ABBREVIATIONS

A. Materials and operations shall comply with the latest revision of the Codes and Standards listed below:

AASHTO	American Association of State Highway Transportation Officials.
ANSI	American National Standards Institute
AREA	American Railway Engineers Association
ASTM	American Society for Testing and Materials
BM	Base Mix
FS	Federal Specifications
HMA	Hot Mix Asphalt
IM	Intermediate Mix
MSDS	Material Safety Data Sheets
OSHA	Occupational Safety and Health Administration
RAP	Recycled Asphalt Pavement
SM	Surface Mix
VDOT	Virginia Department of Transportatio**n**

Note: Designations such as ASTM, AASHTO, VDOT, etc. referenced through out this specification imply the latest revision.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Plant operations shall be in accordance with Section 211, *Asphalt Concrete* of the VDOT *Road and Bridge Specifications*, latest revision.

B. Limitation for producing and placing ashpalt mixtures shall comply with Sections 211, *Asphalt Concrete* and 315, *Asphlalt Concxrete Pavement* of the VDOT Road and Bridge Spe*cifications*.

C. Shipping and storing shall be in accordance with Section 210, *Asphalt Materials* of the VDOT *Road and Bridge Specifications*.

D. Hauling equipment shall be in accordance with Section 315.03 *Equipment* of the VDOT *Road and Bridge Specifications*.

E. Delivery:

1) Hauling equipment shall be loaded in a manner to minimize segregation of the mix.

2) Haul trucks must park in a designated area to minimize tracking of tack coats.

3) Once loaded, haul trucks shall proceed immediately to the job site.

1.8 COORDINATION

A. Coordinate manhole and valve box adjusting with the City of Fairfax Public Works Director.

B. Coordinate tie-in to municipal roadways with the City of Fairfax Public Works Director.

C. All new paved areas shall have positive drainage to eliminate ponding. Where new paved areas join existing, measures shall be taken to incorporate positive drainage to eliminate ponding.

D. Repair of pavement markings: When cuts are made through any paved surface and the cuts extend through the pavement markings, the replaced pavement shall be marked to match the existing.

PART 2 – PRODUCTS

2.1 AGGREGATE BASE COARSE

Aggregate Base material shall be designated as Type 1 size 21A or 21B in accordance with Section 208, *Subbase and Aggregate Base Material* of the VDOT *Road and Bridge Specifications*.

2.2 BITUMINOUS CONCRETE PAVEMENTS

Bituminous Concrete Pavements shall be in accordance with Section 211.02, *Materials* of the VDOT *Road and Bridge Specifications*.

2.3 PORTLAND CEMENT (STABILIZATION) TREATED AGGREGATE

Portland Cement Treated Aggregate shall be in accordance with Section 307, *Hydraulic Cement Stabilization* of the VDOT *Road and Bridge Specifications*.

2.4 LIME STABILIZED SOIL

Lime-treated soils shall be in accordance with Section 306, *Lime Stabilization* of the VDOT *Road and Bridge Specifications*.

2.5 BITUMINOUS SEAL COAT

Bituminous Seal Coat shall be in accordance with Section 312, *Seal Coat* of the VDOT *Road and Bridge Specifications*.

2.6 BITUMINOUS SLURRY SEAL SURFACES

A. **Asphalt Emulsion**: Emulsified asphalt shall conform to the requirements of Section 210, *Asphalt Materials* of the VDOT *Road and Bridge Specifications*, except it shall be quick setting emulsion and the following requirements shall apply:

1) The emulsion shall be designated CQS-1h cationic quick setting emulsion and shall conform to the requirement of Cationic Type CSS-1h.

2) The Cement Mixing Test is waived.

3) Emulsion Setting Time: Prior to shipment of each new formulation of emulsified asphalt, the Contractor shall perform a towel test to verify that the emulsion will set sufficiently quick for early release of traffic. Testing for setting time shall be in accordance with VTM-89.

B. **Aggregate**: Aggregate shall be crushed stone and except for locations where the posted speed limit is 15 mph or less and for roadways in Traffic Groups I through VII, it shall be non-polishing. The quality of aggregate shall conform to the requirements of Section 202, *Fine Aggregate* of the VDOT *Road and Bridge Specifications*, except that the loss on soundness shall not exceed 18%. The sand equivalent value shall not be less than 40.

Gradation shall be as follows for the type mix specified:

DESIGN RANGE TABLE			
Sieve Size	**Type A (% Passing)**	**Type B (% Passing)**	**Type C (% Passing)**
No. 3/8	100	100	100
No. 4	100	90-100	70-95
No. 8	65-90	65-90	45-70
No. 16	45-70	45-70	32-54
No. 30	30-50	30-50	23-38
No. 50	18-33	18-33	16-29
No. 100	10-21	10-21	9-20
No. 200	5-15	5-15	5-12
Design Asphalt Content Range[a]	8.0-10.5%	8.0-10.5%	7.0-9.5%
[a]Residual Asphalt content by weight of dry aggregate.			

C. **Mineral Filler**: Mineral filler shall conform to the requirements of Section 201, *Mineral Filler* of the VDOT *Road and Bridge Specifications*.

D. **Water**: Water used in the mix shall conform to the requirements of Section 216, *Water for Use with Cement or Lime* of the VDOT *Road and Bridge Specifications*.

E. **Mix Design**: The Contractor shall submit for the Public Works Director's approval a mix design for each type slurry on Form TL-127, results of the Compatibility Test as per VTM-60, and wear loss by the Wet Track Abrasion Test as prepared by an approved testing laboratory. The Wet Track Abrasion Test (WTAT) shall be performed in accordance with VTM-14. The wear loss shall not be greater than 75 grams per square foot. The wear loss shall apply to the asphalt content limit designated on the job mix formula. Such limits shall be determined by selecting the optimum asphalt content from the WTAT loss curve and within the ranges shown in the Design Range Table above in paragraph B and applying a tolerance of plus or minus 1.5 percent.

2.7 COLD PATCH

Cold Patch mixture shall have good workability and be capable of being placed at temperatures of 20º F to 140º F without the addition of heat. The mixture shall have good adhesion to wet surfaces and be resistant to damage by water, salt, and deicing products. It shall consist primarily of crushed stone, cut-back asphalt and additives. The mixture must be uniform and not require any mixing prior to use. It shall be capable of being removed from the container without significant adherence to the container. Application of the mixture must be able to be accomplished by hand labor. Traffic must be able to travel over the mix with little to no compaction immediately after installation without pick-up of the mix by vehicle tires. The mixture shall cure and harden with continued vehicle use. Provide MSDS sheets with product.

Approved products include the following:

Product	Manufacturer
Q-Patch	Big River Industries Baton Rouge, LA
Ultra-Patch	Road Repair Products Douglasville, GA
QPR-2000	QPR Norcross, GA
UPM Asphalt Product	Unique Paving Material Corp. 3993 East 93rd St. Cleveland, OH 44105

2.8 GEOTEXTILE PAVEMENT OVERLAY SYSTEM

A needle punched, non-woven polypropylene Geotextile fabric saturated with uncut bituminous cement equal or exceeding Petromat® 4559 as manufactured by Amoco Fabrics and Fibers Company. The fabric is to be placed between a prepared original pavement surface and a bituminous concrete overlay. The fabric shall meet the following physical properties:

Physical Properties			
Property	Test Method	Units	Value
Grab tensile strength	ASTM D4632	Lbs	90
Grab tensile elongation	ASTM D 4632	%	50
Mullen Burst	ASTM D 3786	psi	180
Asphalt retention	ASTM D 6140	Gal/yd^2	0.20
Asphalt retention	ASTM D 6140	Oz/yd^2	3.0
One side heat-set			yes

2.9 TACK COAT

Tack Coat shall be in accordance with Section 310, *Tack Coat* of the VDOT *Road and Bridge Specifications*.

2.10 PAVEMENT MARKINGS

Pavement marking materials shall be in accordance with Section 246, *Pavement Markings* of the VDOT *Road and Bridge Specifications*.

PART 3 – EXECUTION

3.1 GENERAL

Construction and testing shall conform to the applicable sections of Divisions I, II, III, V, and VII of the *Virginia Department of Transportation Road and Bridge Specifications*, latest revision. Other requirements for base coarse and pavement are also set out on the drawings and on the standard details shown in the VDOT *Road and Bridge Standards, Volume I and II*, a copy of which is herein incorporated by reference.

3.2 PAVEMENT, PATCHES, REPAIR AND REPLACEMENT

A. **General**: This work shall consist of replacing subbase stone, and bituminous material in the street in areas where it becomes necessary to remove the original pavement such as for sewer trenches, water main trenches, drainage pipe ditches, etc. Pavement repair shall be the type to match the existing street pavement as sown on the drawings or as determined by the Public Works Director**.**

B. **Cutting Pavement**

Where a utility line is proposed to be placed in an existing paved area, the edges of the pavement for the utility line shall be cut in a straight line, parallel to the pipe on each side (see **Standard Details 401.07 and 401.08**). Perform cutting operations prior to installation of line to avoid excessive removal of pavement. Care shall also be taken during installation of pipe to avoid damage to adjoining paved surfaces.

C. **Surface Tolerances**

The bituminous patched surface will be tested using a 10-foot straightedge. The variation of the surface from the testing edge of the straightedge between any two contacts with the surface shall not exceed ¼-inch allowing for the contours of the existing pavement. All humps or depressions exceeding the specified tolerance shall be corrected or the defective work removed and replaced with new material. Any deviation from this standard will be at the discretion of the Public Works Director.

3.2.1 PERMANENT PAVEMENT REPAIR

Excavation: Excavation of the existing pavement and subbase shall be made to a depth as shown on **Standard Detail 401.07**. Before the placement of any stone, concrete or bituminous material, a representative of the Public Works Director shall inspect the underlying subgrade. The Contractor shall be responsible for correcting any ruts or soft yielding places to a depth of approved suitable subgrade before placing of the bituminous material.

A. **Bituminous Pavement Repair**

Aggregate Base Stone: The aggregate base shall be done in accordance with **Standard Detail 401.07** and compacted to the density specified in VDOT *Road and Bridge Specifications*, Section 309, *Aggregate Base Coarse*.

Bituminous Concrete Pavement: Placing of the bituminous concrete pavement shall be done in accordance with **Standard Detail 401.07**. Compact to the density specified in VDOT Road and Bridge Specifications, Section 315 *Asphalt Concrete Pavement*.

1) **Bituminous Base Coarse**: Before placing any bituminous material, all sides of the existing pavement and subbase shall be thoroughly tacked at the rate of 0.3 Gal/SY.

2) **Bituminous Surface Coarse**: The finished surface shall abut the existing pavement with no overlap allowed. Care shall be taken to insure a uniform grade between the existing pavement and the new surface.

B. **Concrete Pavement Repair**

Aggregate Base Stone: The aggregate base shall be placed to a depth as shown on the drawings and compacted to the density specified in VDOT Road and Bridge Specifications, Section 309 *Aggregate Base Coarse*.

Concrete Pavement: Placing of the concrete pavement shall be done in accordance with the drawings or as directed by the Public Works Director using 4000 psi air entrained concrete at 28 days. The Public Works Director reserves the right to require that the Contractor pull concrete test cylinders for verifying concrete strength. Concrete is to meet VDOT *Road and Bridge Specifications*, Section 217, *Hydraulic Cement Concrete*.

3.2.2 TEMPORARY PAVEMENT REPAIR

A. **Bituminous Pavement Repair**

When shown on the plans, during winter months when bituminous concrete asphalt is unavailable, or when directed by the Public Works Director, temporary pavement patches conforming to **Standard Detail 401.08** shall be employed. The Contractor shall maintain the temporary repair to the satisfaction of the Public Works Director until the permanent pavement repair is made. Before placing any bituminous material, all sides of the existing pavement and subbase shall be thoroughly tacked at the rate of 0.3 gal/SY.

Density shall conform to the applicable sections referenced above under permanent pavement repair for each particular product (i.e. aggregate base coarse, bituminous concrete asphalt).

B. Once hot bituminous mix is available, all temporary patch material shall be removed and replaced with a permanent hot bituminous patch within ninety calendar days.

3.3 AGGREGATE BASE COARSE (ABC)

A. **Weather Limitations**

Stabilized aggregate base coarses shall not be constructed unless the atmospheric temperature is at a minimum of 35º F and rising. Any areas of completed base coarse that are damaged by freezing shall be reconditioned, reshaped, and recompacted.

B. **Subgrade Approval**

The underlying coarse upon which the aggregate base coarse is to be placed shall be prepared in accordance with the requirements Section 02200 – *Earthwork* of these specifications. Prior to any spreading operations, the underlying coarse shall be checked and accepted by the Public Works Director or his/her representative for adequate compaction and surface tolerances. The surface of the subgrade shall be dry and clean of all foreign substances. Any

ruts or soft yielding places that may appear in the subgrade and any areas having inadequate compaction shall be corrected by loosening, removing and adding approved material, reshaping, recompacting the affected areas to line and grade, and to the specified density before the base coarse is applied.

C. **Installation of Aggregate Base Coarse**

The aggregate base coarse shall be mixed in an approved central mixing plant of the pugmill type and water added during mixing operations in the amount necessary to provide the optimum moisture content for compacting. After mixing, the material shall be transported to the job site and placed on the roadbed by means of an approved aggregate spreader.

The aggregate base coarse shall be constructed in layers not less than 3 inches nor more than 6 inches of compacted thickness. When vibrating with other approved types of special compacting equipment, the compacted depth of a single layer of the aggregate base coarse may be increased to 8 inches upon approval. The aggregate, as spread, shall be uniform in gradation with no segregation or pockets of fine or coarse material. Frequent template checks shall be made to ensure that a minimum amount of patching is necessary after complete compaction is secured.

D. **Compaction Operations and Density Requirements**

After mixing and spreading, the aggregate base coarse shall be thoroughly compacted at optimum moisture within +20% of optimum. Rolling shall progress gradually from the sides to the center and shall continue until the entire area of the coarse has been rolled by the rear wheels. Rolling shall continue until the material has been compacted to not less than 100 percent density when tested in accordance with AASHTO T191, *Density of Soil In-Place by the Sand-Cone Method* or ASTM D698.

E. **Grading Tolerances of Final Surface**

After final rolling, the surface shall be inspected and any irregularities in excess of ½ inch shall be corrected. Aggregated base coarse shall conform to the lines, grades, and typical cross sections shown on the plans, details or as established by the Public Works Director within a tolerance of +/- ½ inch. Any irregularities in the surface shall be corrected by scarifying, remixing, reshaping, and recompacting until a smooth surface is obtained. If directed by the Public Works Director, the aggregate base shall be opened to public traffic for at least 2 weeks before being surfaced. During this time, the surface shall be protected against loss of fine material by the addition of moisture as necessary.

3.4 HYDRAULIC CEMENT STABILIZATION

Placement of Hydraulic Cement Stabilization shall be in accordance with VDOT *Road and Bridge Specification* Section 307, *Hydraulic Cement Stabilization*.

3.5 LIME-TREATED SOIL

Lime-treated Soil shall be performed in accordance with VDOT *Road and Bridge Specification* Section 306, *Lime Stabilization*.

3.6 BITUMINOUS CONCRETE PAVEMENT

3.6.1 CONDITIONING EXISTING SURFACE

A. **Priming Existing Surface:**

A tack or prime coat of liquid asphalt shall be applied between the existing surface and each bituminous coarse placed thereafter. The tack or prime coat shall conform to the applicable requirements of VDOT *Road and Bridge Specifications* Sections 310, *Tack Coat* and 311, *Prime Coat*.

Bitumen classed as cutbacks or emulsions shall be applied ahead of the paving operations, and the time interval between applying and placing the paving mixture shall be sufficient to ensure a tacky residue providing maximum adhesion of the paving mixture to the base. The mixture shall not be placed on tack or prime coats that have been damaged by traffic or contaminated by foreign material. Traffic shall be excluded from such section.

On rich sections or those that have been repaired by the extensive use of bituminous patching mixtures, the tack coat shall be eliminated when directed by the Public Works Director.

Contact surfaces of curbing, gutters, manholes, and other structures projecting into or abutting the pavement and cold joints of bituminous concrete asphalt shall be painted with a thick uniform coating of liquid asphalt prior to placement of bituminous concrete asphalt mixture.

Exception: When bituminous concrete asphalt to be placed has a total thickness of 4 inches or more, priming with liquid asphalt material will not be required on aggregate subbase or base material. *See paragraph 1.3 A, Definitions for* definition of *Prime Coat.*

B. **Tacking**

Contact surfaces of curbing, gutters, manholes, and other structures projecting into or abutting the pavement and cold joints of bituminous concrete asphalt shall be painted with a thick uniform coating of liquid asphalt prior to placement of bituminous concrete asphalt mixture. Application of tack at joints, adjacent to curbs, gutters, or other appurtenances shall be applied with a hand wand at the rate of 0.2 gallons per square yard. At joints, the hand wand applied tack shall be 2 feet in width with 4 to 6 inches protruding beyond the joint for the first pass. Tack for the adjacent pass shall completely cover the vertical face of the mat edge, so that slight puddling of asphalt occurs at the joint, and extends a minimum of 1 foot into the lane to be paved. Milled faces that are to remain in place shall be tacked as above for the adjacent pass. Use of tack at longitudinal joint vertical faces will not be required when paving in echelon.

Tack shall be applied in such a manner as to offer the least inconvenience to traffic and to permit a minimum of one way traffic without pickup or tracking. Care shall be taken to prevent spattering of adjacent pavement, structures, trees, and private property. Any spattering will be cleaned up by the contractor at no cost to the City.

Payment for tack shall be included in bituminous concrete asphalt prices.

See paragraph 1.3 A, Definitions for definition of *Tack Coat.*

C. **Tack Coating Horizontal Surfaces**: See paragraph 3.7, *Tack Coat*.

D. **Removing Depressions/Irregularities**

Where irregularities in the existing surface would result in a coarse more than 3 inches in thickness after compaction, the surface shall be brought to a uniform grade by snatching with a thin layer of bituminous concrete asphalt not exceeding the minimum thickness as recommended for that type of mix. Then the material shall be thoroughly compacted until it conforms to the surrounding surface. The mixture used shall be the same as that specified for the surface mix to be placed.

E. **Bicycle/Greenway/Trail subgrade – Herbicide Treatment**:

Herbicides shall conform to Section 244.02(a), *Herbicides* of the VDOT *Roads and Bridge Specifications* shall be applied to the aggregate base coarse and/or subgrade no more than 15 minutes prior to paving. The rate of application shall be as recommended by the herbicide manufacturer. Herbicides shall not be used where they may contaminate water used for irrigation and drinking purposes. Herbicides shall also not be applied in areas classified as SA waters or unnamed tributaries to SA waters.

3.6.2 PAVEMENT PROFILING - MILLING

The work included under this contract item shall consist of the removal of existing bituminous surfaces of in-place pavements on various streets within the City of Fairfax, to produce the desired profile, cross-section, and surface conditions as specified by the Public Works Director. All removed material shall become the property of the Contractor.

The contractor shall plan and prosecute a schedule of operations so that milled roadways will be overlaid with bituminous concrete asphalt as soon as possible, and, in no instance, shall the time lapse exceed 7 days after the milling operations, unless otherwise specified. The milled areas of the roadway shall be kept free of irregularities and obstructions that may create a hazard or annoyance to traffic in accordance with the requirements of VDOT *Road and Bridge Specification* Section 104.04, *Maintenance During Construction*.

The Contractor shall plan and prosecute the milling operation to avoid trapping of water on the roadway. At the discretion of the Public Works Director, cutting drainage slots in roadway shoulders or inlets may be required, at no additional costs. The Contractor shall also restore the cut drainage slots afterwards.

A. The equipment and manpower furnished for this work shall be:

1) A cold milling machine capable of cutting at least 2 inches and 55 inches wide in flexible pavement while leaving a uniform cut and rideable surface capable of handling traffic prior to placement of a new bituminous overlay. The ground speed of the machine shall be independent of the cutting equipment. The machine shall maintain a sharp cutting edge at all times. The machine shall have a self-contained water system for control of dust and

fine particles. The machine shall be capable of working in wet and dry conditions with temperatures down to 32º F.

2) The width of the machine shall be such to allow for one lane of traffic at all times. The machine shall be capable of cutting within 1 inch of manholes, valve box tops and facedown walks with a minimum radius of 5 feet.

3) If the machine is not self-loading, then a capable loader shall be furnished for placing the material onto trucks.

4) A power broom is to be used for cleaning the planed surfaces.

5) The contractor shall furnish all hose and water.

6) Traffic control and flagman to be provided as noted in Section 01000 – *General Requirements*.

B. The construction methods shall be as follows:

Where bituminous pavement extends into the existing curb and gutter, the contractor shall be required to plane at different slopes. The first cuts shall remove the material existing above the gutter line. These cuts will be made at the appropriate gutter slope (1/2":1') for 2-foot curb and gutter and (1":1') for 2.5-foot curb and gutter. Any curb and gutter with a different slope will be planed at the existing curb and gutter slope.

The last cuts shall remove the material to a depth of 1" below the gutter line with a street cross-section slope of 1/4":1' or to slope of existing street.

Where curb and gutter exists but the pavement is at or below the existing gutter line, the pavement will be cut to a depth of the thickness of overlay below the gutter line while adjusting street cross-section to 1/4":1' toward the centerline of the street.

Where existing straight curbing has pavement built up to expose less than 6 inches of curbing, the pavement will be planed down on grade of 1/4":1' or whatever the existing grade of the street back to the street centerline until a desired height of curbing is exposed.

Where center of pavement has correct crown but, pavement has rutting or ripples (possibly caused by vehicular braking), the pavement will be planed to the depth necessary to remove all such defects.

C. **Surface Casting Adjustments/Preparation**: See paragraph 3.12 B *Surface Casting Adjustments*.

3.6.3 PAVING OPERATIONS

A. **Bituminous Concrete Pavement Equipment**

Bituminous concrete pavement equipment shall be in accordance with Section 315.03, *Equipment* of the VDOT *Road and Bridge Specification*.

B. **Transportation of Bituminous Mixture**

Transportation of bituminous mixture from the paving plant to the site shall be in trucks having tight, clean, and smooth beds. Each load shall be covered with canvas or other suitable material of ample size to protect it form the weather and to prevent the loss of heat. The mixture shall be delivered to the area to be paved in such a manner that the temperature at the time of dumping into the spreader will not be less than 225º F. Any loads wet excessively by rain will be rejected. Hauling over freshly laid material will not be permitted.

C. **Placing and Furnishing**

Bituminous concrete asphalt shall only be placed when the weather conditions are suitable (see paragraph I, *Placement Limitations*, below).

Bituminous concrete asphalt shall not be placed until surface upon which it is to be placed has been approved by the Public Works Director. Prior to delivery of surface coarse material, the base coarse shall be completed for receiving the surface coarse material and shall be kept from traffic, with the exception of the mixture vehicles and those other vehicles necessary for the placement of asphalt.

For strip paved streets, the edge of the pavement shall be marked by means of a continuous line placed and maintained a sufficient distance ahead of the paving operation to provide proper control of the pavement width and horizontal alignment.

Contact surfaces of curb and gutters, manholes, etc., shall be painted with a thin uniform coating of cut-back asphalt just before the surface mixture is placed against them. Immediately adjacent to headers, flush curbing, gutters, liners, and other structures, the surface coarse mixture shall be spread uniformly high so that after the final compaction it will be approximately 1/8 inch above the edge of the structure.

An approved asphalt paver shall be used to distribute the bituminous mix over the widest pavement width practicable. Wherever practicable and when the capacity of sustained production and delivery is such that more than one paver can be operated, pavers shall be used in echelon to place the wearing coarse in adjacent lanes. Crossovers, as well as areas containing manholes or other obstacles that prohibit the practical use of mechanical spreading and finishing equipment, may be constructed using hand tools. However, care shall be taken to obtain the required thickness, jointing, compaction, and surface smoothness.

The longitudinal joint in one layer shall offset that in the layer immediately below by approximately 6 inches. However, the joint in the wearing surface shall be at the centerline of the pavement if the roadway comprises two traffic lanes or at lane lines if the roadway is more than two lanes in width. Offsetting layers will not be required when adjoining lanes are paved in echelon and the rolling of both lanes occurs within 15 minutes after laydown.

The contractor shall have a certified Asphalt Concrete Paving Technician present during paving operations. Immediately after placement and screeding, the surface and edges of each layer shall be inspected and straightedged by the technician and necessary corrections performed prior to compaction. The finished pavement shall be uniform and smooth.

The placement of bituminous concrete shall be as continuous as possible and shall be scheduled such that the interruption occurring at the completion of each day's work will not detrimentally affect the partially completed work. Material that cannot be spread and finished in daylight shall not be dispatched from the plant unless the use of artificial lighting has been approved. When paving is performed at night, sufficient light shall be provided to properly perform and thoroughly inspect every phase of the operation. Such phases include cleaning planed surfaces, tack application, paving, compacting, and testing. Lighting shall be provided and positioned such as to not create a blinding hazard to the traveling public.

During paving operations, the Contractor shall be responsible for furnishing and erecting temporary "no parking" signs on each street that is to be paved to prevent residents from parking their vehicles in the way of construction. The signs shall be erected at least 24 hours prior to paving operations and on each side of the street as necessary.

D. **Layer Thickness**

Bituminous concrete SUPERPAVE pavement coarses shall be placed in layers not exceeding 4.0 times the nominal maximum size aggregate in the bituminous mixture. The maximum thickness may be reduced if the mixture cannot be adequately placed in a single lift and compacted to required uniform density and smoothness. The minimum thickness for a pavement coarse shall be no less than 2.5 times the nominal maximum size aggregate in the bituminous mixture. Nominal maximum size aggregate for each mix shall be defined as one sieve size larger than the first sieve to retain more than 10 percent aggregate as shown in the design range specified in Section 211.03, *Job Mix Formula* **Table II-13** of VDOT *Road and Bridge Specifications*.

Recommended thickness Chart	
Mix Type	**Minimum Thickness (inches)**
SM 9.5X	1.5
SM 12.5X	2
IM 19.0X	2
BM 25.0X	4

E. **Joints**

1) **General**: All joints shall present the same texture, density, and smoothness as other section of the coarse. The joints between old and new pavements or between successive days' work shall be carefully made in such a manner as to insure a continuous bond between old and new sections of the coarse. All contact surfaces of previously constructed pavements shall be painted with a thin, uniform coat of hot bituminous material just before the fresh mixture is placed.

Care shall be exercised when tying into curb and gutter and newly overlayed travel lanes to ensure a uniform grade and joint.

The contractor shall construct the final riding surface to tie into the existing surface by cutting a notch 1 inch deep by 1 inch wide for all tie-ins to existing pavement, including driveways and ramps. Suitable guide lines or devices shall be used to ensure cutting of the joint on a true line. The joint shall be thoroughly cleaned and dried prior to being sealed. This work shall be done at no additional cost to the City.

Method of temporary joints at the end of each workday shall be approved by the Public Works Director.

In addition to the following, both longitudinal and transverse joints shall conform to Section 315.05, *Procedures,* paragraphs (c) and (f), respectively of the *VDOT Roads and Bridge Specifications*.

2) **Transverse**: The roller shall pass over the unprotected end of the freshly laid mixture only when the laying of the coarse is to be discontinued or when delivery of the mixture is interrupted to the extent that the unrolled material may become cold. Construct a sloped wedge ahead of the end of the full dept pavement to provide for compaction and the protection of the full depth pavement. Place a paper parting strip beneath this wedge to facilitate joint construction unless waved by the Public Works Director. Before paving operations are resumed, remove the sloped wedge and cut back into the previously constructed pavement to the point of full pavement depth to expose an even vertical surface for the full thickness of the coarse.

3) **Longitudinal**: In all cases, the edges of cold longitudinal joints shall be cut back to expose an even, vertical surface for the full thickness of the coarse prior to constructing the adjacent pavement.

F. **Compaction**

Immediately after the bituminous mixture is placed and struck off and surface irregularities are corrected, the mixture shall be thoroughly and uniformly compacted by rolling.

During compaction of bituminous concrete asphalt, the roller shall not pass over the end of freshly placed material except when a construction joint is to be formed. Edges shall be finished true and uniform.

The surface shall be rolled when the mixture is in the proper condition. Rolling shall not cause undue displacement, cracking, or shoving.

The number, weight, and type of rollers furnished shall be sufficient to obtain the required compaction while the mixture is in a workable condition. The sequence of rolling operations and the selection of roller types shall provide the specified pavement density. However, the minimum and maximum roller weight shall be 5 tons and 10 tons, respectively.

Immediately after the hot mixture is placed, it shall be sealed with rollers. Thereafter, rolling shall be a continuous process, insofar as practicable, and all parts of the pavement shall receive uniform compaction. In the event that the rolling operation is not able to properly keep up with the placement of the mixture, the finishing machine shall be stopped and no mixture shall be laid until the rolling has been caught up.

Rolling shall begin at the sides and proceed longitudinally parallel to the center of the pavement, each trip overlapping at least ½ the roller width, gradually progressing to the crown of the pavement. When abutting a previously placed lane, the longitudinal joint shall be rolled first, followed by the regular rolling procedure. On superelevated curves, rolling shall begin at the low side and progress to the high side by overlapping of longitudinal trips parallel to the centerline.

Displacements occurring as a result of reversing the direction of a roller, or from other causes, shall be corrected at once by the use of rakes or lutes and addition of fresh mixture when required. Care shall be taken in rolling not to displace the line and grade of the edges of the bituminous mixture. The motion of the roller shall be at all times slow enough to avoid displacement of the hot mixture. All roller marks must be eliminated.

To prevent adhesion of the mixture to the rollers, the wheels shall be kept properly moistened with water or water mixed with a very small quantity of detergent or other approved material. Excess liquid will not be permitted.

Along forms, curbs, headers, walls, and other places not accessible to rollers, the mixture shall be thoroughly compacted with hot hand tampers, smoothing irons, or mechanical tampers. On depressed areas, a trench roller may be used or cleated compression strips may be used under the roller to transmit compression to the depressed area.

Edges of bituminous pavement surfaces shall be true curves or tangents. Irregularities shall be corrected.

The surface of the compacted coarse shall be protected until the material has cooled sufficiently to support normal traffic without marring.

G. **Density**

Density requirements shall be in accordance with Section 315.05 (e), *Density* of the VDOT *Road and Bridge Specification*, latest revision.

H. **Pavement Samples**

As may be required by the Public Works Director to verify pavement thickness, the Owner/Contractor shall core the completed work and provide reports on the results of the corings in accordance with Section 315.06, *Pavement Samples* of the VDOT Road and Bridge Specification. Suitability of the samples shall be based on the limits of precision specified in Section 315.07, *Pavement Tolerances*, of the VDOT Road and Bridge Specification.

I. **Placement Limitations**

No surface coarse shall be laid unless the ambient air temperature is a minimum of 45º F and rising. Asphalt mixtures that have temperatures of less than 225º F, when ready to dump into the mechanical spreader, will be rejected. All compaction rolling shall be completed prior to the mat cooling down to 175º F. Finish rolling may be performed at a lower mat temperature. Other placement limitations, to include but not limited to, mixture temperatures, and cold weather

paving shall be in accordance with Section 315.04, *Placement Limitations* of the VDOT *Road and Bridge Specification*.

J. **Pavement Tolerance**

The surface will be tested by using a 10-foot straightedge. The variation of the surface from the testing edge of the straightedge between any two contacts with the surface shall not be more than 1/4 inch. Humps and depressions exceeding the specified tolerance shall be corrected, or the defective work shall be removed and replaced with new material.

3.7 TACK COAT

Procedures and equipment shall be in accordance with Section 310, *Tack Coat* of the VDOT Road and Bridge Specifications and Section 3.6, Bituminous Concrete Pavement of these specifications.

All castings, the gutter edge, and other surfaces which pavement rests against shall be painted with asphalt tack coat material by way of a hand brush, or other approved means, prior to the placing of the surface coarse. All asphaltic cement or other materials which discolor the surface of concrete structures and items which are spilled or placed on such surfaces shall be removed at the Contractor's expense. His inability to remove such foreign and disfiguring stains shall result in the complete removal of the structures so stained or disfigured, and these removed structures or surfaces shall be replaced at his expense. Particular care shall be taken to prevent tack coat from getting into and on gutter areas.

When resurfacing existing pavements, the exiting pavement shall be tacked with CRS-1h asphalt at the rate of 0.05 gallon per SY to 0.10 gallon per SY. Application of the tack coat shall be made by an approved asphalt distributor. The tack coat shall be allowed sufficient time to "break" prior to beginning the resurfacing operation.

3.8 SEAL COAT

Seal coat shall be in accordance with Section 312, *Seal Coat* of the VDOT *Road and Bridge Specification*.

3.9 ASPHALT SURFACE TREATMENT

Asphalt surface treatment shall be in accordance with Section 313, *Stabilized Open-Graded Material* of the VDOT *Road and Bridge Specification*.

3.10 BITUMINOUS SLURRY SEAL SURFACES

3.10.1 EQUIPMENT

A. **General**

All equipment, including hand tools, shall be designed or suitable for the application of slurry and be in good working order. A mobile unit is required and shall be equipped with an accurate mineral filler feeder, a fog type spray bar, be capable of an operation speed of 60 feet per minute, and have capacity to store mix components to produce a minimum of 5 tons of slurry seal. The equipment shall be capable of delivering a continuous uniform and homogeneous mixture of

aggregate, emulsion, water, and mineral filler to the spreader box. Mixing aid additive dispensers, if used, shall be capable of uniformly adding the additive to the water line prior to entering the mixing chamber.

B. **Equipment Calibration**

The Contractor shall provide current year data for each mixing unit utilizing materials from the same sources as those to be used on the project. Data for each unit shall be in the form of a graphic scale indicating the stone gate setting required to obtain the residual asphalt content as determined in the mix design. Such data shall be maintained with each unit.

C. **Spreader**

The spreader shall be equipped with a flexible type squeegee positioned in contact with the pavement surface. The spreader shall be designed to apply a uniform spread with a minimum loss of slurry. The spreader box shall be equipped with augers extending its full width which shall uniformly distribute the slurry mixture across the entire width of the box. The box shall be equipped with an approximately 18 inch wide burlap drag to smooth the slurry.

D. **Auxiliary Equipment**

Hand squeegees, shovel, and hand equipment shall be provided as necessary to perform work in areas which are inaccessible to the unit.

E. **Cleaning Equipment**

Power brooms, power blowers, air compressors, water flushing equipment, and hand brooms shall be suitable for cleaning the surface and cracks of the old surface.

F. **Suspension of Work**:

If during the life of this project, excessive loss of cover aggregate occurs, the Public Works Director may suspend work in accordance with Section 108, *Prosecution and Progress of Work* of the VDOT *Road and Bridge Specifications* until cause of the loss of cover material is corrected.

3.10.2 PLACEMENT OF SLURRY SEAL

A. **Beginning Work**

The Contractor shall notify the Public Works Director at least 3 work days prior to beginning work. Two works prior to beginning work, the Contractor shall provide 6 quarts of liquid emulsion and 50,000 grams of aggregate materials for the City's use in determining asphalt content.

B. **Preparation of surface**

The surface upon which slurry seal is to be applied shall be thoroughly cleaned of all loose material, vegetation, silt spots, and other objectionable materials by either brooming or the use of compressed air.

C. **Application**

When warranted by local conditions or when the pavement temperature is above 90º F, the surface of the pavement shall be fogged with water at a rate of 0.05 gallons per square yard immediately preceding the pass of the spreader. The slurry mixture shall be of a consistency such that it "rolls" in the spreader box in a continuous mass. Slurry that segregates in the spreader box, so that flowing of liquids (water and emulsion) is evident, is not acceptable and shall not be applied. The liquid portion of a slurry mixture shall not flow from either the spreader box or the applied material. A mixing aid additive may be used when necessary to accommodate slow placement or high temperatures.

The slurry shall be uniformly placed on the road in full lane widths up to and including 12 feet. Excess buildup of slurry on longitudinal and transverse joints shall be corrected.

Treated areas shall not be opened to traffic until such time as the slurry seal has cured to the extent that it will no longer be damaged by traffic (where earlier opening to traffic is necessary, such as at entrances, the Contractor may lightly sand the surface using the same aggregate as in the mix and may be required to remove excess aggregate from the roadway in curb and gutter sections). The applied slurry mixture shall be uniform in texture and shall not flush under traffic. In the event a failure occurs prior to acceptance, the Contractor shall repair or replace the failed treatment as directed by the Public Works Director.

Slurry seal surface coarse shall not be applied on surfaces containing puddled water and on surfaces less than 50º F, except that in the early AM the minimum surface temperature will be 40º F provided the ambient temperature is expected to be above 60º F.

Should oversize aggregate be encountered, the Contractor shall immediately cease operation until approved corrective measures have been taken.

A certified paving technician shall be at the job site at all times.

D. **Rate of Application**

The minimum aggregate application rate shall be 16 pounds per square yard for Type A and Type B and 20 pounds per square yard for Type C. The average minimum thickness of application shall not be less than 3/16 inch unless otherwise specified.

The Contractor shall provide to the Public Works Director aggregate weight tickets, a daily delivery summary, and an estimate of aggregate lost and otherwise not used in the work for each stockpile location. Where disagreements occur, the Public Works Director shall have the final judgment of such loss.

E. **Curing**

Treated areas shall be allowed to cure until such time as the Public Works Director permits opening to traffic.

F. **Sampling and Testing**

If required by the Public Works Director, the Contractor shall perform the following tests: asphalt content, consistency test, and Wet Track Abrasion Test.

3.11 GEOTEXTILE PAVEMENT OVERLAY SYSTEM

A. Asphalt Distributor

The distributor truck shall be metered and capable of spraying tack coat at a specified uniform application rate. The applicator shall provide uniform coverage without gaps, partial overlaps, or otherwise create heavy streaking. The truck shall be equipped with a hand spray nozzle to distribute tack coat in locations inaccessible by the truck.

B. Fabric Laydown Equipment

The fabric can be installed with a mechanical unit mounted on the front of a tractor or on the back of the distributor truck. Manual units can be used for small jobs. Provide stiff bristle brooms or pneumatic rollers to smooth fabric. Provide all tools such as scissors or blades for cutting fabric.

Do not permit traffic directly on fabric.

C. Surface Preparation

Air and pavement temperatures during installation should be warm enough for the tack coat to remain tacky after placement. Ambient temperatures should be at least 50ºF and rising for bituminous cement tack coat or 60ºF and rising for asphalt emulsions.

Clean old pavement of dirt, water, oil, and foreign materials. Fill cracks as directed by the Public Works Director, with suitable filler (such as asphalt cement or rubberized asphalt). Repair larger cracks and potholes with a properly compacted hot mix or other similar filler as directed by the Public Works Director.

Badly broken pavement is an indication of a failed subgrade and should be dug out and replaced before overlaying. If the surface is rough but stable, the Public Works Director may require milling or placement of a leveling coarse before installation of the Geotextile pavement overlay system. The surface should be dry prior to tack coat and fabric placement.

D. Application of Tack

The tack coat must be applied uniformly at the specified rate with calibrated distributor truck. The application temperature should be high enough to assure uniform distribution (290ºF to 325ºF for asphalt cements, up to 160ºF for heavier grade emulsions). The tack coat should be applied 2 to 3 inches wider than the edge of the fabric.

Fully saturate the fabric and provide a bond to the overlay without providing excess tack coat that could mix with the overlay of the asphalt. The optimum amount depends on the porosity of the old pavement, fabric weight, tack coat material, and other variables. Typically, 0.2 to 0.3 gal/yd^2 of pure asphalt cement tack coat is used with the fabric. Emulsion tack coat application rates

are greater to provide the same amount of residual asphalt cement. Verify the applications rates with the Geotextile manufacturer and coordinate with the Public Works Director prior to application.

If asphalt emulsions are used, the water in the emulsion must be allowed to evaporate completely before the fabric is placed. Bonding may be inadequate if moisture is trapped between pavement layers. Required cure time varies with emulsion type, humidity, ambient temperature, and other factors. Verify the cure times with the Geotextile manufacturer and coordinate with the Public Works Director prior to application.

E. **Fabric Placement**

Place the fabric on the pavement surface, smooth side up, while the tack coat is still tacky. Drive the vehicle straight to avoid wrinkling. Turns should be made gradually. For sharp curves or corners, cut fabric to size and place by hand. Hand broom or pneumatic roll to eliminate small wrinkles. Large wrinkles (with a height of 1 inch or more) should be slit and laid flat in the direction of paving. Overlay joints a 2 to 4 inches. Apply additionally tack coat to joints and overlapped fabric layers to ensure proper fabric saturation. The tack coat temperature should not exceed 325ºF when the fabric is placed.

F. **Hot mix overlay**

Standard paving operations should closely follow fabric laydown. All areas in which paving fabric has been placed should be paved during the same day. If the fabric becomes wet, allow to dry before paving. Unless directed otherwise by the City of Engineer, a minimum compacted asphalt thickness of 1.5 inches shall be placed to provide adequate heat and pressure to bond the systems.

3.12 PREPARATION OF PAVEMENT FOR RESURFACING

A. **Preparation of Surface**: Prior to beginning paving operations, the existing areas to be resurfaced shall be thoroughly cleaned by the Contractor to the satisfaction of the Public Works Director. This cleaning shall include sweeping of the streets with a power operated broom, cutting excess debris with a grader, washing with a water truck, and hand cleaning any debris left over after this operation is complete. Cleaning operations shall commence just prior to the resurfacing of streets. In addition, the Contractor shall expose any existing paving areas, which have been covered by soil, grass, or debris. These areas shall be thoroughly cleaned, herbicide applied, and tacked before resurfacing. Any excess material left over after this operation shall be removed or spread out to the satisfaction of the Public Works Director. No additional payment shall be made for this work.

When the surface of the existing pavement or base is irregular, it shall be brought to a uniform grade and cross section as directed by the Public Works Director. The surface on which the bituminous concrete is to be applied shall be prepared in accordance with the requirements of the applicable specifications.

When specified, prior to placement of bituminous concrete, longitudinal, and transverse joints, and cracks in cement concrete pavement shall be sealed by the application of an approved joint sealing compound.

B. **Surface Casting Adjustments/Preparation**

Any surface casting such as water boxes, manholes, grates, cleanouts, etc. shall be set to grade prior to beginning of paving operation. All telephone manholes and gas boxes are to be adjusted by the utility companies or contractor if approved by the Public Works Director. All such castings shall be adjusted within a tolerance of 1/8 inch below or flush with the asphalt finished elevation. Unless directed otherwise by the Public Works Director, manhole adjusting rings, in accordance with **Standard Detail 401.06**, shall be used for resurfacing. The Contractor shall be required to coat the top of any such casting with a suitable coating material to prevent adhesion of the bituminous material to the casting. A tack coat of bituminous material, conforming to the requirements of these specifications, will be applied prior to resurfacing operations.

Protection of Manholes and Valve boxes prior to final paving: Where the rim and cover of a manhole or a valve box extends more than 1 inch above an unfinished road surface, a temporary layer of asphaltic concrete feathering shall be provided to provide a smooth transition from 1 inch below the edge of the rim and cover to the unfinished road surface. A 12:1 slope ratio shall be used. The exposed sides of the manhole and/or valve box shall be painted bright orange or as specified by the Public Works Director. Prior to final paving, Contractor shall remove feathering completely and apply asphalt tack coat to binder to insure proper asphalt adhesion

3.13 PROTECTION OF ASPHALTIC SURFACE COARSE

Sections of newly placed and compacted asphalt surface coarse shall be barricaded and protected from all defects for a period of at least 8 hours until they have become properly hardened by cooling. Protect asphalt from petroleum products during and following placement of surface coarse.

If patching is required to make repairs, the base material in place shall be removed to a minimum depth of 4 inches, replaced with bituminous concrete base coarse (type BM 25.0) and surfaced with 2 inches of SM 9.5A bituminous asphalt concrete.

3.14 PAVEMENT MARKINGS

A. **General**

1) **Applicable Design Standards**: Marking layout, dimensions, colors, etc. shall be subject to the requirements of the Manual on Uniform Traffic Control Devices (MUTCD) and the applicable details of the VDOT *Road and Bridge Standards, Volume I and II*. Unless otherwise noted below, pavement marking materials, preparation, and application shall comply with Sections 246, *Pavement Marking* and Section 704, *Pavement Markings and Markers* of the VDOT *Road and Bridge Specifications*.

Prior to marking, all pavements are to be free of grease, oil, mud, dust, dirt, grass, loose gravel, and other deleterious material.

Marking material shall not be applied within 24 hours following rain or other inclement weather.

B. **Thermoplastic Striping**:

1) All thermoplastic striping shall be a VDOT approved mix that minimizes the slipperiness of the marking surface.

2) Thermoplastic traffic line paint shall be a reflectorized thermoplastic pavement striping material applied to the road surface in a molten state by mechanical means. It shall have surface application of glass beads, which, upon cooling to normal pavement temperature, will produce an adherent reflectorized stripe of the specified thickness and width.

3) The markings must be capable of conforming to pavement contours, breaks and faults through the action of traffic at normal pavement temperatures. The markings shall have resealing characteristics, such that it is capable of fusing with itself and previously applied thermoplastic when heated with a torch.

4) The markings must be able to be applied in temperatures down to 32 °F, without any special storage, preheating, or treatment of the material before application.

5) Thermoplastic paint shall comply with Section 246.02(c), *Thermoplastic Pavement Marking Material (Type B, Class I)* of the VDOT *Road and Bridge Specifications.* The material shall contain at least 25% by weight of graded premixed glass beads. It must contain a minimum of 8% titanium dioxide pigment (ASTM D476 Type 2) to ensure a color similar to Federal Highway White, Color No. 17886, as per Federal Standard 595.

6) The surface must have a minimum skid resistance value of 55 BPN when tested according to ASTM E303, *Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester,* latest revision.

7) The material shall set to bear traffic in not more than 2 minutes when the road temperature is 50ºF or more.

C. **Existing Pavement Markings:**

1) Prior to the installation of paint or thermoplastic pavement marking lines and symbols, existing pavement markings shall be removed by a method, which does not materially damage the existing pavement surfaces.

2) Materials deposited on the pavement and adjacent surfaces as a result of the removal of pavement markings shall be removed as the work progresses.

3) When a blast removal method is used, care must be taken to protect adjacent surfaces and structures from flying debris.

4) Painting over or black out painting of existing pavement markings with black paint or bituminous solutions shall not be allowed.

END OF SECTION 02740

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